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A BRIEF REVIEW IN NON-SPECIFIC LOW BACK PAIN: EVALUATION AND PHYSIOTHERAPY INTERVENTION

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ABSTRACT

Background: Low back pain was the most common case in musculoskeletal disorders. Non-specific low back pain (NSLBP) described as low back pain with no clear causal relationship between the symptoms, physical findings, and imaging findings. This study aimed to briefly review the evidence the evaluation and intervention for NSLBP in physiotherapy practice. **Methods:** In this study, the library research method was used, which took online and offline data sources referring to books, journals, articles related to the topic of evaluation and physiotherapy intervention in NSLBP conditions as a data source to answer research objective **Results:** Some researchers commonly assess the pain, range of motion (ROM), functional ability and quality of life. As a regular treatment for non-specific low back pain, some study recommended general therapeutic exercise and manual therapy to reduce the problematic of non-specific low back pain. **Conclusion**: Physiotherapist can evaluate patients with NSLBP based on the patients complains like pain using VAS or NPRS, Lumbar ROM using schober method, functional disability using ODI or RMDQ and Quality of life. For the physiotherapy intervention of non-specific low back pain, we can summarize that the first-line management of NSLBP is self-management exercise. Furthermore, physiotherapist can use any method of therapeutic exercise and manual therapy to reduce pain, improve lumbar ROM, increase functional ability and quality of life.

Keywords: Non-specific Low Back Pain, Evaluation, Intervention, Physiotherapy

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INTRODUCTION

Low back pain was the most common case in musculoskeletal disorders [1]. The challenge when managing the low back pain was diagnosing the low back pain and choose the treatment [2]. In general, the low back pain consists of two types, which is specific and non-specific low back pain (NSLBP). Low back pain with specific type can be divided into low back pain that related to vertebrae and non-vertebrae. In the other hand, NSLBP described as low back pain with no clear causal relationship between the symptoms, physical findings, and imaging findings [3]. In addition, NSLBP is classified into low back pain, which is not related to the neurological problem and degenerative syndrome [4].

Previously, some research showed that NSLBP mainly affected the young population. Non-specific low back pain has also increased in the general community, which have affected the adolescents and middle-aged worker [5]. Nordin et al. reported that the incidence of NSLBP among undergraduate student in health sciences programs was 40.3%, the incidence was associated with the age, years of study, physical fitness, and hours they spent sitting in the classroom [6]. Another research by Anggiat et al. showed a similar result that students in a university experience NSLBP with 74.6% [7]. Also, a community-based program revealed that teachers also experience low back pain with more than half of the teacher population [8].

Numerous research already conducted to evaluate the non-specific low back pain. The most common evaluations were pain assessment, trunk flexibility, functional ability and quality of life [9,10,11]. Those evaluations seem to be correlated with the population which experienced NSLBP because the NSLBP mainly causes pain, reduced flexibility of trunk movement, functional limitation and sometimes also affected to quality of life [12]. Furthermore, most studies also conducted in the physiotherapy intervention for NSLBP. Physiotherapy was the first line care to give intervention in person who experienced NSLBP [13]. Some research was done resulting recommendation of using home exercise program, manual therapy and general exercise therapy [2, 14, 15].

From the background, this study aimed to briefly review the evidence the evaluation and intervention for NSLBP in physiotherapy practice. In addition, with this article, the physiotherapist will easily use the evidence to treat the non-specific low back pain.

METHOD

In this study, the library research method was used, which took online and offline data sources referring to books, journals, articles related to the topic of evaluation and physiotherapy intervention in NSLBP conditions to answer research objective. The use of books is focused on basic science such as evaluation and applied anatomy. In the intervention, articles in journals and clinical guidelines were used that recommend physiotherapy in NSLBP conditions. The searching strategy was conducted a literature search using the online database in google scholar for ‘‘physiotherapy for non-specific low back pain’’ The bibliographies of particularly relevant articles were searched as well.

RESULT AND DISCUSSION

Applied anatomy and contributing factor of NSLBP: Non-specific low back pain mainly related with posture or poor body mechanic. There are several other factors caused the NSLBP with anatomical problem. Some anatomical related factors can be contributed to the incidence of NSLBP. Lumbar flexion motion is performed by rectus abdominis, external and internal oblique. For extension motion is performed by illiocostalis, longissimus, semi spinalis, multifidus. For lateral flexion motion, performed by quardatus lumborum and also assisted by illiocostalis,

longissimus, spinalis. For rotation motion, the prime mover is tranversus abdominis, and multifidus work contralateral for every rotation motion [16]. Some muscles of the back that related with the low back pain are tranverse abdominis, internal obliques, erector spinae and multifidus. Those muscles will indicate low back pain problem if the muscle has poor muscular endurance, which is related with, prolonged posture activity [17]. Currently, multifidus muscle dysfunction is being implicated as a contributory factor in the development or recurrence of sub-acute and chronic back pain [18].

In general, NSLBP has two classifications; an acute stage, which pain lasts less than 12 weeks and chronic stage, which pain lasts more than 12 weeks [19]. According to Taguchi, chronic NSLBP was due to physiological structural fragility in lumbar region, and often caused by improper posture, which can be called a living functioning impairment [4]. A research showed that mobility of the spine reduced causing disorders in muscle synergies and consequently increased the energy cost of maintaining postural ability [14].

One of the causes of NSLBP is postural pain caused by prolonged sitting activity for about 2 hours a day, which causes increased discomfort in the body [20,21]. Sitting in a slumped position is also associated with fatigue in the internal oblique muscles and/or transverse abdominis which keeps the spine in one position so that it makes these muscles prone to injury and can also be caused by atrophy of the multifidus and para-spinal muscle [21].

Another study also reported that sitting in a position such as the excessive kyphotic posture with frequent lumbar flexion or the excessive lordotic posture with too much extension can result in low back pain [22]. A study in Japan, it was reported that 22% of the population aged 20-85 years had NSLBP [23]. In line with several other studies, it also reported that students, office workers and teachers also experience NSLBP due to prolonged sitting for at least 3 hours a day [6,7,8]. The pain produced by NSLBP in a population of both students, teachers and office workers can affect physiological and psychological stress and sometimes cause secondary disturbances in the form of decreased quality of life [4, 5].

Evaluation for NSLBP: To assess the effect of low back pain to individual life, the physiotherapist will carry out several assessments to evaluate low back pain and its impact. Some researchers commonly assess the pain, range of motion (ROM), functional ability and quality of life [9,10,15,24]. Physiotherapist commonly uses the visual analogue scale (VAS) to assess the pain perception of low back pain [15, 25]. In a study by Hawker et al. shouted that the VAS is self-completed by the respondent.

They also mentioned that the VAS is widely used due to simplicity and adaptability to a broad range of population and settings [26]. As a subjective measurement of pain, VAS consists of a 10 cm line with two end-points representing 'no pain' and 'worst imaginable pain'. Patients will have asked to rate their pain by placing a mark on the line corresponding to their current level of pain [27].

The VAS is a well-known assessment tool for pain and recommended as a means of rating the subjective pain [20]. Another version with the same meaning of VAS, physiotherapist can use Numeric Pain Rating Scale (NPRS) which consist of number 0 for no pain until 10 which worst worst imaginable pain. Physiotherapists can use either of these pain evaluations because those pain evaluation tool have the same validity and reliability [26].

As the pain was assessed in the non-specific low back pain, another assessment that related with pain was the flexibility of the lumbar spine, where the pain will affect the flexibility of lumbar spine [28]. Furthermore, a study by Wong and Lee describes that there is a correlation between patients with LBP and the

decreased lumbar ROM [29]. The flexibility of the lumbar spine is related to the lumbar range of motion (ROM). They also conclude that the lumbar ROM should be evaluated after the treatment of LBP to know the effects of the treatment. Previously, some researcher decided to use a measuring tape to evaluate the lumbar ROM [10,30]. Tape measurements were the least expensive method to measure spinal movement and perhaps the easiest to use [31]. In order, to measure flexion and extension of lumbar, the modified Schober method can be used by the physiotherapist [32]. Some studies also reported that the Schober method was one of the good methods to assess the lumbar flexibility [32, 33].

In order, to measure lateral flexion, the fingertip-to-floor method can be used as an additional measurement of lumbar ROM [31]. However, flexion and extension were the most commonly used as the main evaluation of the lumbar range of motion in low back pain cases [10, 34].Clearly, the flexion and extension movement is the main segmental movement of the lumbar spine [35].

The risk of people with NSLBP who have high pain score may also develop functional disability [36]. Furthermore, to evaluate disability, should to use disability measurement along with pain measurement. In other studies, it was reported that pain was also associated with impaired functional activity, which in this case could cause disability, where a high rate of disability was associated with high pain rates [37]. Activity disorders that can occur in patients with NSLBP are activities indoor and outdoor activity such as on travelling, climbing and descending stairs, walking, wearing clothes, eating, using the toilet, using public transportation and other social activities [38].

Several studies provide recommendations using the Oswestry Disability Index (ODI) for assessment of functional disability caused by LBP [39,40,41]. The Oswestry disability index (ODI) is aimed specifically at LBP conditions and is the best standard in evaluating the functional activity of people with NSLBP both before and after the intervention [39]. Furthermore, research from Fairbank and Pynsent stated that ODI has been translated into several languages including English and can then be used validly and reliably for examining conditions of back pain related to disability evaluation [42].

On the other hand, other evaluation related to functional activities, the physiotherapist can use the Rolland-Morris Disability Questionnaire (RMDQ) [43]. In general, RMDQ also has similar validity and reliability to ODI, but in detail, ODI is still superior in evaluating NSLBP patients [44, 45].

Furthermore, the RMDQ is still considered a very useful evaluation tool in evaluating the condition of NSLBP patients. Similar to ODI, RMDQ also evaluates the patient's status in terms of pain, dysfunction and disability [43]. Thus, evaluation before and after the intervention can be carried out using the questionnaire to see the changes that occur before and after the intervention.

Non-specific low back pain with a long period of time can affect the quality of life. Pain that is quite severe has contributed to reducing the quality of life of an individual [46]. Furthermore, in their study, it was concluded that the LBP condition was quite severe and reduced activity was also associated with physical functional disorders and even caused mental disorders and individual productivity.

Followed by other research by Tsuji et al. also reported that the condition of pain was quite high and disturbances in quality of life affected the decrease in productivity of workers with NSLBP [47]. Furthermore, they also suggested to be able to evaluate the quality of life of individuals who have NSLBP as an essential examination. In field of education, Kennedy et al. also reported that students with LBP affect their quality of life by decreasing psychosocial

aspects such as experiencing sadness, being overwhelmed and exhausted [48].

Evaluation of quality of life generally uses the Health-related quality of life (HRQoL) questionnaire. The questionnaire in the quality of life examination is generally classified into generic, condition specific, or patient specific. In evaluating the HRQoL in low back pain population, the condition-specific instrument of HRQoL can be used.

The HRQoL is a multidimensional concept that refers to function and well-being on various dimensions of health, including physical, emotional, social and spiritual aspects of life [49.] Some of the HRQoL instruments that can be used to assess the quality of life on low back pain patient is the Short Form 36-items Health Survey (SF-36) or with other short versions such as SF-12 or SF-8 [50].

Physiotherapy Intervention: As a regular treatment for non-specific low back pain, some study recommended general therapeutic exercise to reduce the impairment of NSLBP [51, 52]. The type of general exercise for low back pain mainly is an active stretching, which easily performed by the patient [53]. A study by Gawda et al. revealed that the stretching therapy that done by the patients could be effective to reduce the low back pain [14]. In their study, the physiotherapist gives some example to do the stretching until the patients can do the stretching by themselves. Some guidelines, also reported some educational exercise that can be done by the low back pain patient to manage the low back pain [19,54]. In 2016, National Institute for Health and Care Excellence (NICE) produce an assessment and management guideline for the low back pain. In that guidelines, described that the self-management was the first management for low back pain [13].

A review study by Bardin, King and Maher also recommended self-management exercise along with hot-pack as the first line care for NSLBP [2]. The use of hot packs considered as a pain relief that provides analgesia effect and muscle relaxation [2,55]. Self-management exercise or educational home exercise program with hot packs also recommended by a health care guideline as a management of low back pain patient [54]. A research by Taguchi stated that the therapeutic heating is often conducted by physiotherapy for the chronic NSLBP, despite the effectiveness in not clear, however, from the viewpoint of relaxation, the purpose of therapeutic heating is reducing the pain [4].

Furthermore, several clinical guidelines provide recommendations for interventions in the management of LBP in clinical practice. In America, the clinical practice guidelines made by the American Physical Therapy Association (APTA) recommend several interventions that can be used in general in LBP patients [43].

The first recommendation is to use manual therapy with joint mobilization or thrust manipulation to reduce pain and disability. Then, for therapeutic exercise intervention is recommended using back-specific strengthening, coordination and endurance exercises. Those two recommendations are based on strong recommendations. In addition, it is also recommended to use patient education/counseling for disruption of activities due to LBP and increase endurance with fitness and endurance activity based on moderate and strong recommendations.

Another clinical recommendation in the United Kingdom also provides several options in physiotherapy intervention in LBP conditions [13]. In addition to using self-management exercises, physiotherapists are also recommended to use exercise therapy such as exercises based on biomechanics, aerobics or in combination with other types of exercise. Just like in APTA guidelines, in the next recommendation, physiotherapy is also recommended using manual therapy such as mobilization or spinal manipulation and also soft tissue manipulation. Besides, they also recommend using psychological therapy such as the cognitive-

behavioral approach in combination with exercise therapy or manual therapy.

In a study by Oliviera et al. that reviewed clinical practice guidelines for the management of NSLBP, recommended several suggestions related to physiotherapy interventions in NSLBP [56]. In general, in the types of physiotherapy interventions, they recommend exercise therapy for the management of both acute and chronic NSLBP. Although the types of exercise therapy are still considered inconsistent, physiotherapists can use various types of exercise therapy according to the therapist's ability. Subsequently, manual therapy with spinal manipulation has also become a recommended intervention in the management of both acute and chronic NSLBP.

In manual therapy, the physiotherapist can choose to use spinal mobilization or manipulation, however, exercise therapy has several types of methods that can be used according to the physiotherapist's ability to perform the methods [13,43]. Exercise therapy that can be recommended is the motor control exercise approach and core stability exercises [57,58]. Exercises using directional preference of spine movement as known as McKenzie method or the other name is Mechanical Diagnosis and Therapy (MDT) can be used as well [59].

Furthermore, exercise therapy with a proprioceptive approach such as Proprioceptive Neuromuscular Facilitation which is rarely used in musculoskeletal cases, can be used in NSLBP patients as well. All types of exercise therapy have a beneficial effect in reducing pain, increasing lumbar ROM and improving functional activity and quality of life with no superiority among each other methods [41,60].

This study is a simple short review study in the evaluation and intervention of physiotherapy in NSLBP conditions. There are still many limitations in this research, so that, in the future, a more comprehensive review study method should be carried out.

CONCLUSIONS

Numerous research has been able to provide very useful information to the physiotherapist to evaluate and treat the patients with NSLBP. Based in this present study, we can conclude that physiotherapist can evaluate patient with NSLBP based on the patient's complaints such as pain using VAS or NPRS, Lumbar ROM, functional disability using ODI or RMDQ and quality of life questionnaire.

For the physiotherapy intervention of NSLBP, we can summarize that the first-line management of NSLBP is self-management exercise. Furthermore, physiotherapist can use any method of therapeutic exercise and manual therapy to reduce pain, improve lumbar ROM, increase functional ability and improve the quality of life.

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Compliance with Ethics: This study based on review of previous conducted studies with does not contain any studies with human or animals.

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